

NUTRITION STATUS AND HANDGRIP STRENGTH AMONG ELDERLY SITUATED IN PEKANBARU, INDONESIA

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ABSTRACT

Handgrip strength has been widely used as a lead measure in geriatric conditions such as frailty. This condition tends to be experienced by the elderly due to nutritional factors. The study aims to determine the association of nutritional status toward hand grip strength among elderly. Observational analytic cross-sectional design was used and a total of 120 elderly were selected via cluster sampling situated in Tenayan Raya Sub-District, Pekanbaru, Indonesia. Mini Nutritional Assessment (MNA) was utilized to measure the nutritional status of elderly and dynamometer was used to assess their handgrip strength. Data were analyzed using chi square test. Results revealed that that elderly obtained low handgrip strength (43.3 %) and they are at risk of malnutrition (27,.5%). Moreover, it was found out that there is association between nutritional status and handgrip strength ($p=0.011$). It is concluded that nutrition status plays a vital role in hand grip strength among elderly. As such, further study is recommended to verify its results to other context or elderly population groups.

Keywords: *Elderly, Handgrip Strength, Nutrition status, Observational-Analytic Design*

1. INTRODUCTION

Recently, the elderly population has increased significantly in most countries and regions around the world (United Nations, 2015) (He, Goodkind, & Kowal, 2016). In Indonesia, the proportion increases along with the degree of health and welfare, causing a tendency of more sarcopenia cases (Vitriana, Irma Ruslia Defi, & Irwan Nugraha, 2016). One of the triggers of decrease in muscle mass and strength is aging (Sekarsari, Vitriana, & Defi, 2018). Aging has an impact on the progressive decrease in muscle mass and strength (Kim & Choi, 2013). This contributes to the elderly condition and increases hospitalization, immobilization, malnutrition, and mortality (Widajanti et al., 2020) (Hai et al., 2017).

Hand grip strength plays an important role in the daily lives of people and serves as a reliable proxy indicator of an individual's hand motor abilities. Many daily functions such as carrying require the use of the flexor musculature of the forearms and hands, and these are the muscles that are involved in gripping strength (Ong et al., 2017). Low Handgrip Strength was positively associated with age (Confortin et al., 2018). Hand grip strength was correlated with nutritional status (Setia, 2018). Previous studies have explained that there is an increase in hand grip strength in the elderly, especially those in the community. Currently, no prevalence data has been found in the special rural and urban areas in Pekanbaru City, Indonesia. This study aimed to examine the correlation between nutrition status toward hand grip strength.

2. MATERIAL AND METHODS

This was an observational analytic study with a cross-sectional. The study was conducted from August to October 2020. It was in Tenayan Raya Sub-District which has the highest number of elders in Pekanbaru City with 13 villages, and each is divided into hamlets/neighborhoods. The 120 elderly were selected using the cluster sampling technique obtained from the Slovin formula ($n = \frac{N}{1 + Ne^2}$) with an error value of 5% (Ryan, 2013). The inclusion criteria were the elderly that worked together during the study, did not experience mental health, hearing and vision problems. But, had a stroke and severe cardiorespiratory or cardiovascular problems. Furthermore, those

receiving therapy or drugs that affect exercise capacity, and also suffered from a disease that caused muscle mass loss.

Questionnaires were divided into two groups, namely the independent and dependent variable questionnaire. The independent variables were nutritional status. Meanwhile, the dependent variable was hand grip strength.

The original questionnaire English was translated into Indonesia. All translation and backtranslation were performed according to the recommended approach (Cha, Kim, & Erlen, 2007). Nutritional status used the Mini Nutritional Assessment (MNA). According to Bauer JM, Kaiser MJ, Anthony P et al (2008), MNA is a measure of sensitivity and specificity, which has high reliability. This is an appropriate method for the elderly population's evaluation and the detection of subjects with normal nutritional status, and those at risk of malnutrition (Isautier et al., 2019) (FERRARI BRAVO et al., 2018). The MNA was good levels of reliability for the total score, the categorized score and for most of its items (Bleda, Bolibar, Pares, & Salva, 2002). The nutritional status instrument was assessed based on 3 categories, namely malnutrition (0-7 Points), risk of malnutrition (8-11 points), normal (12-14 points).

Handgrip strength is the maximum muscle strength produced by the contraction of the hand muscle during handgrip. The handgrip strength measurement was performed using hand dynamometer in a standing position. The data analysis used was multivariate logistic regression.

The participants were ensured informed and confidentiality that participation was voluntary and that older people could drop out of the study at any time. The study received ethical approval from ethical review board for medicine and health research medicine faculty Riau University (Number.B/13/UN.19.5.1.1.8/UEPKK/2020).

3. RESULTS AND DISCUSSION

Table 1: Age, Gender, marital status, Education level, Nutritional status, hand grip strength among elderly (n = 120)

Respondent characteristics	Number (%)
Age (Mean ± SD)	63.3± 37
Gender	
Male	25 (20.83)
Female	95 (79,17)
Marital status	
Married	90 (75)
Widower/widow	30 (25)
Education	
Elementary school	45 (37.5)
Junior high school	70 (58.33)
Senior High School	5 (4.17)
Nutritional Status	
Malnutrition	14 (11.7)
At Risk malnutrition	33 (27.5)
Normal	73 (60.8)
Hand Grip Sternght	
Low	52(43,3)
Normal	68(56,7)

According to Table 1, 52 (43.3%) of the participants experienced low hand grip strenght, mean of them were 63.3 years old, mostly females, 90 (75%) were married. and 70 (58.33%) were junior high school. The education level was mostly junior school, 70 (58.33%), while 73 (60.8 %) had normal nutritional status.

Table 2:Nutritional staus toward hand griot strength among the elderly in Pekanbaru City (Total = 120)

Variable	Hand Gript strength				<i>P-value</i>
	Low		Normal		
	N	%	N	%	
Nutritional status					
Malnutrition	7	1.34	7	10.29	0.011
At Risk malnutrition	21	40.38	12	17.64	
Normal	24	46.15	49	72.05	

The relationship between nutritional status and Hand grip strength in the elderly in Tenayan Raya District

The bivariate analysis of nutritional status related to hand grip strength in the elderly in Tenayan Raya District, Pekanbaru City showed p-value of 0.011. Moreover, 27,5 % of malnutrition in the elderly was assessed by MNA which is the best validated and most widely used test to measure nutritional status. Handgrip strength and malnutrition have similar and common physiological mechanisms as well as overlap in older adults (Zunic & Peter, 2018).

4.CONCLUSIONS AND RECOMENDATION

This study found that there were correlation between nutrition status toward hand grip strength.

The *Posyandu* or integrated service post for the elderly in Tenayan Raya Public Health Center needs to be optimized. This requires continuous collaboration between the doctors, nurses, nutritionist, families, religious and community shops.

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